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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/929,516	08/13/2001	Frank Paetzold	EYEM1340	8236
23394	7590	07/13/2004	EXAMINER	
ROBROY R FAWCETT 1576 KATELLA WAY ESCONDIDO, CA 92027			CAO, HUEDUNG X	
			ART UNIT	PAPER NUMBER
			2821	

DATE MAILED: 07/13/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/929,516

Applicant(s)

PAETZOLD ET AL.

Examiner

Huedung X Cao

Art Unit

2821

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 April 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over SHAW et al. (6,320,583) in view of CHEN (5,608,839) and HOFFBERG et al. (5,875,108)

As per claim 1, Shaw teaches the claimed "method for generating facial animation values using a sequence of facial image frames and captured audio data of a speaking actor" (Shaw, column 7, lines 1-15), comprising the steps for: "providing a

Art Unit: 2821

plurality of visual-facial-animation values based on tracking of facial features in the sequence of facial image frames of the speaking actor" (Shaw, column 11, lines 20-34); "providing a plurality of audio-facial-animation values based on visemes detected using the captured audio voice data of the speaking actor" (Shaw, column 12, lines 48-65); and "combining the plurality of visual facial animation values and the plurality of audio facial animation values to generate output facial animation values for use in facial animation" (Shaw, column 13, lines 19-35). It is noted that Shaw does not teach the capture of the audio data of a speaking actor and its video facial image is in a "synchronous" manner as claimed. Chen teaches that the "synchronously" captured audio data of a speaking actor and its facial image is well known in the art (Chen, column 4, lines 56-57). It is also noted that Shaw does not teach "tracking, without using markers on the speaking actor". However, there are many technique to track the actor motions without using the markers such as head-mounted optical face tracker, image analysis, deformable templates, active contours, ... or the use of wavelet transform (Hoffberg, column 18, lines 1-21). It would have been obvious at the time the invention was made, in view of the teaching of Chen and Hoffberg, to configure Shaw's method as claimed because Shaw's recorded "visemes" morph (column 3, lines 44-50) representing the speaking word and its corresponding visual facial character would be from a video/audio signal of synchronous audio and video data for a realistic and lively represent of speaking person. Applicant's arguments filed April 28, 2004 have been fully considered but they are not deemed to be persuasive. The tracking of motion

Art Unit: 2821

without using the markers are well known in the art (see Hoffberg, column 18, lines 1-21).

Claim 2 adds into claim 1 “the output facial animation values associated with a mouth for a facial animation are based only on the respective mouth-associated values of the plurality of audio facial animation values” which Shaw teaches in column 13, lines 16-18.

Claim 3 adds into claim 1 “the output facial animation values associated with a mouth for a facial animation are based on a weighted average of the respective mouth-associated values of the plurality of visual facial animation values and the respective mouth-associated values of the plurality of audio facial animation values” which Shaw teaches in column 13, lines 32-34.

Claim 4 adds into claim 1 “the output facial animation values associated with a mouth for a facial animation are based on Kalman filtering of the respective mouth-associated values of the plurality of visual facial animation values and the respective mouth-associated values of the plurality of audio facial animation values” which would have been obvious because Shaw’s combining of the basic facial image and its speaking morph can smooth out the transition through a weight average or filtering process such as Kalman filter.

Claim 5 adds into claim 1 “detecting whether speech is occurring in the synchronously captured audio voice data of the speaking actor and, while speech is detected as occurring, generating the output facial animation values associated with a mouth based only on the respective mouth-associated values of the plurality of audio facial animation

Art Unit: 2821

values and, while speech is not detected as occurring, generating the output facial animation values associated with a mouth based only on the respective mouth-associated values of the plurality of visual facial animation values” which would have been obvious because Shaw’s morph can be used to add any particular characteristic or quality such as emotion, facial movement, speech expression, ... to the original face (Shaw, column 3, lines 29-34).

Claim 6 adds into claim 1 “the tracking of facial features in the sequence of facial image frames of the speaking actor is performed using bunch graph matching” which would have been obvious because Shaw’s delta-zones are used to matching the different sets of facial data to form the desired human face (Shaw, column 7, line 54 to column 8, line 6).

Claim 7 adds into claim 1 “the tracking of facial features in the sequence of facial image frames of the speaking actor is performed using transformed facial image frames generated based on wavelet transformations” which would have been obvious because Shaw facial animation are based on a basic facial image shape and the additional details of facial features which can be represented as wavelet transformation characteristics.

Claim 8 adds into claim 1 “tracking of facial features in the sequence of facial image frames of the speaking actor is performed using transformed facial image frames generated based on Gabor wavelet transformations” which would have been obvious because Shaw facial animation are based on a basic facial image shape and the

Art Unit: 2821

additional details of facial features which can be represented as wavelet transformation characteristics such as Gabor wavelet transformation.

As per claim 9, Shaw teaches the claimed "apparatus for generating facial animation values using a sequence of facial image frames and captured audio data of a speaking actor" (Shaw, column 7, lines 1-15), comprising the steps for: "means for providing a plurality of visual-facial-animation values based on tracking of facial features in the sequence of facial image frames of the speaking actor" (Shaw, column 11, lines 20-34); "means for providing a plurality of audio-facial-animation values based on visemes detected using the captured audio voice data of the speaking actor" (Shaw, column 12, lines 48-65); and "means for combining the plurality of visual facial animation values and the plurality of audio facial animation values to generate output facial animation values for use in facial animation" (Shaw, column 13, lines 19-35). It is noted that Shaw does not teach the capture of the audio data of a speaking actor and its video facial image is in a "synchronous" manner as claimed. Chen teaches that the "synchronously" captured audio data of a speaking actor and its facial image is well known in the art (Chen, column 4, lines 56-57). It is also noted that Shaw does not teach "tracking, without using markers on the speaking actor". However, there are many technique to track the actor motions without using the markers such as head-mounted optical face tracker, image analysis, deformable templates, active contours, ... or the use of wavelet transform (Hoffberg, column 18, lines 1-21). It would have been obvious at the time the invention was made, in view of the teaching of Chen and Hoffberg, to configure Shaw's apparatus as claimed because Shaw's recorded

Art Unit: 2821

“visemes” morph (column 3, lines 44-50) representing the speaking word and its corresponding visual facial character would be from a video/audio signal of synchronous audio and video data for a realistic and lively represent of speaking person. Applicant’s arguments filed April 28, 2004 have been fully considered but they are not deemed to be persuasive. The tracking of motion without using the markers are well known in the art (see Hoffberg, column 18, lines 1-21).

Claim 10 adds into claim 9 “the output facial animation values associated with a mouth for a facial animation are based only on the respective mouth-associated values of the plurality of audio facial animation values” which Shaw teaches in column 13, lines 16-18.

Claim 11 adds into claim 9 “the output facial animation values associated with a mouth for a facial animation are based on a weighted average of the respective mouth-associated values of the plurality of visual facial animation values and the respective mouth-associated values of the plurality of audio facial animation values” which Shaw teaches in column 13, lines 32-34.

Claim 12 adds into claim 9 “the output facial animation values associated with a mouth for a facial animation are based on Kalman filtering of the respective mouth-associated values of the plurality of visual facial animation values and the respective mouth-associated values of the plurality of audio facial animation values” which would have been obvious because Shaw’s combining of the basic facial image and its speaking morph can smooth out the transition through a weight average or filtering process such as Kalman filter.

Art Unit: 2821

Claim 13 adds into claim 9 "means for detecting whether speech is occurring in the synchronously captured audio voice data of the speaking actor and, while speech is detected as occurring, generating the output facial animation values associated with a mouth based only on the respective mouth-associated values of the plurality of audio facial animation values and, while speech is not detected as occurring, generating the output facial animation values associated with a mouth based only on the respective mouth-associated values of the plurality of visual facial animation values" which would have been obvious because Shaw's morph can be used to add any particular characteristic or quality such as emotion, facial movement, speech expression, ... to the original face (Shaw, column 3, lines 29-34).

Claim 14 adds into claim 9 "the tracking of facial features in the sequence of facial image frames of the speaking actor is performed using bunch graph matching" which would have been obvious because Shaw's delta-zones are used to matching the different sets of facial data to form the desired human face (Shaw, column 7, line 54 to column 8, line 6).

Claim 15 adds into claim 9 "the tracking of facial features in the sequence of facial image frames of the speaking actor is performed using transformed facial image frames generated based on wavelet transformations" which would have been obvious because Shaw facial animation are based on a basic facial image shape and the additional details of facial features which can be represented as wavelet transformation characteristics.

Art Unit: 2821

Claim 16 adds into claim 9 "the tracking of facial features in the sequence of facial image frames of the speaking actor is performed using transformed facial image frames generated based on Gabor wavelet transformations" which would have been obvious because Shaw facial animation are based on a basic facial image shape and the additional details of facial features which can be represented as wavelet transformation characteristics such as Gabor wavelet transformation.

Response to Arguments

4. Applicant's arguments filed 04/28/04 have been fully considered but they are not persuasive.

Applicant's arguments on the well known of Kalman filter and the wavelet transformation have been considered, but these features are well known for using to track the motions such as in Hoffberg, column 18, lines 1-21, the wavelet transformation is used to track the motion, and in Freeman (6,115,052, the Kalman filter is used also on tracking the motion, column 11, line 1-column 364, line 67).

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Art Unit: 2821


Inquires

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Huedung Cao whose telephone number is (571) 272-1939.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Don Wong, can be reached on (571) 272-1834. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

7. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Huedung Cao
Patent Examiner


Wilson Lee
Primary Examiner